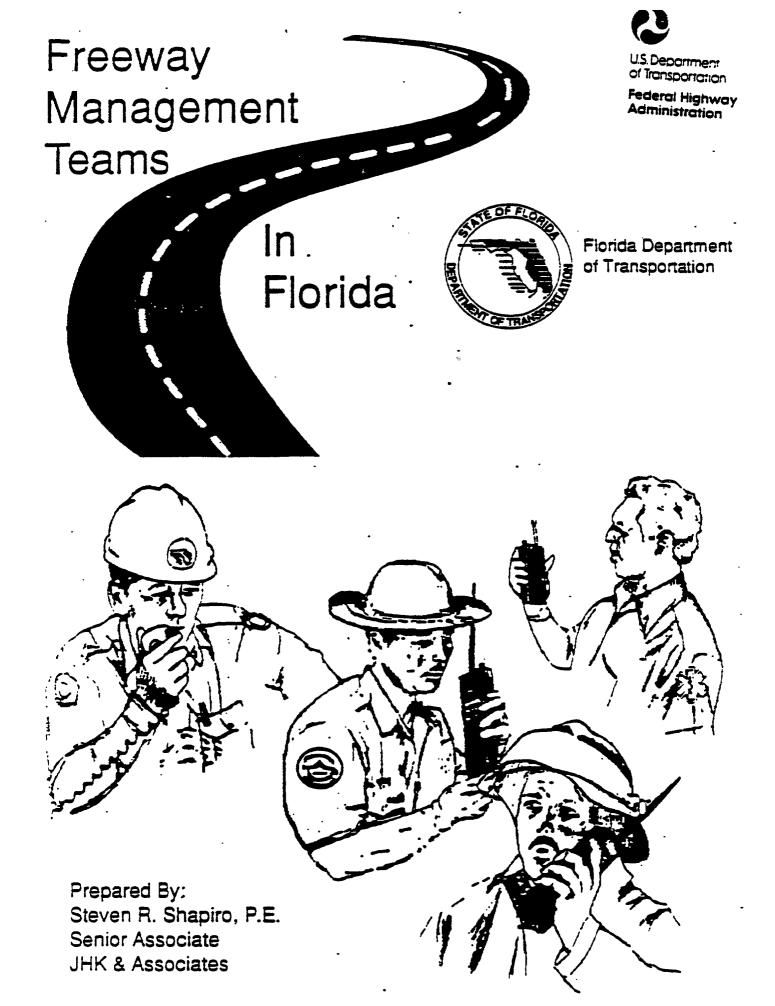
SECTION J

FREEWAY MANAGEMENT AND ACCIDENT INVESTIGATION SITES



ACKNOWLEDGEMENTS

The following materials were prepared for the FLORDIA DEPARTMENT OF TRANSPORTATION

Ben G. Watts, P.E. **Secretary**

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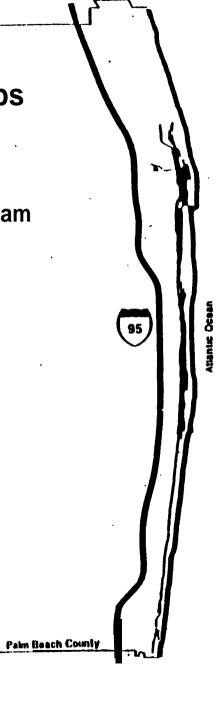
This project was funded by the United States Department of Energy and the Florida Energy Office.

I-95 Diversion Route Maps

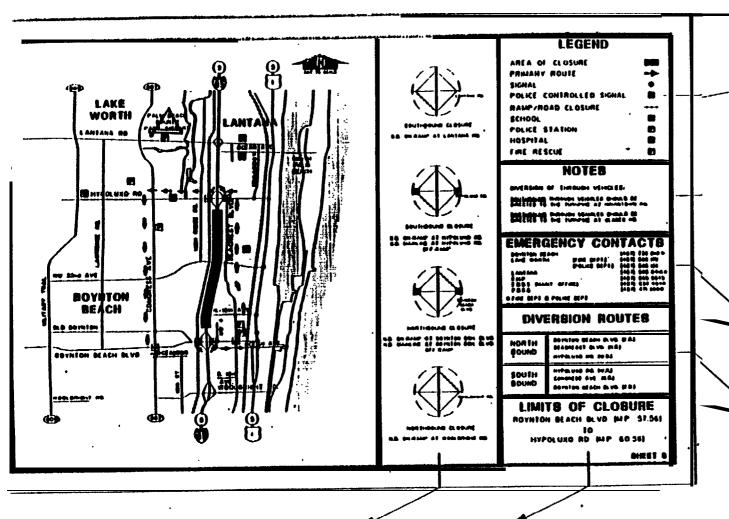
Freeway Incident Management Team

Palm Beach County

September, 1990



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POLICE POST JURISDICTION

Jurstictions shown in large type i.e BOYNTON BEACH

NOTES

Supplementary action required when implementing these diversion routes

EMERGENCY CONTACTS

Emergency telephone numbers provided for agencies near the closure area.

DIVERSION ROUTES

This is a verbal description of the diversion route.

INTERCHANGE DE TAILS

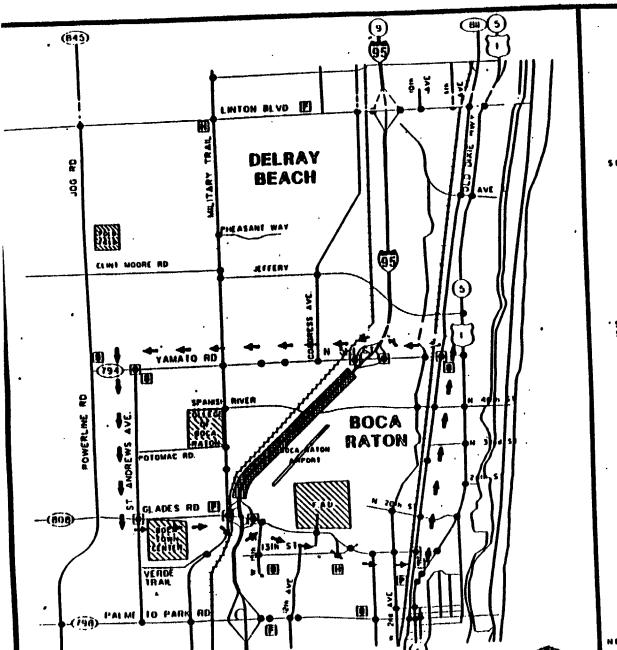
This section contains details of the closures al the interchanges. Closed roadways and tomps shown as

LIMITS OF CLOSURE

Interstate 95 is closed lo vechicular traffic between these stret locations ond mile posts (M.P.) as shown on map by

FREEWAY INCIDENT MANAGEMENT PLAN

GUIDELINES FOR USE OF I-95 OPERATIONS MANUAL





SOUTHBOUND CLOSURE

SO OH HAMP AT LINTON BLVD



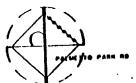
SOUTHBOUND CLOSURE

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HOR THBOUND CLOSURE

NO ON BAMP AT PALMETTO PARK HD

LEGEND

| AREA OF CLOSURE | |
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| PRIMARY ROUTE | - |
| TIGNAL . | • |
| POLICE CONTINUE EN SIGNAL | |
| RAMP/ROAD CLOSURE | ••• |
| SCHOOL | (₫) |
| POLICE STATION . | (₫) |
| HOSPITAL | (H) |
| FIRE RESCUE | (F) |
| | |

NOTES

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HOR THEOLING THROUGH VEHICLES SHOULD BE DIRECTED TO THE TURNPINE AT SAMPLE NO.

EMERGENCY CONTACTS

| BOCA RAION OCLRAY SEACH FIDO 1 (MAIN) OFFICE) PBSO | (407) 338 (333 (407) 243 780) (407) 588 654((407) 663 464 (407) 47) 2001 |
|---|---|
|---|---|

. FIRE DEPT & POLICE DEPT

DIVERSION ROUTES

| NOR TH BOUND | GLADES RD (E B I U.S. I (H B I VAMATO HD IW B I |
|-----------------|--|
| SOUTH BOUND | VAMATO RD (WB1 \$1 ANDREWS AVE (SB) GLADES RD (EB) |

LIMITS OF CLOSURE

GALDES RD (MP 4570) TO YAMATO RD (MP 4806)

MAJOR ACCIDENT RECORD SYSTEM (MARS)

Prepared for:

Florida Department of Transportation State Traffic Operations This report recommends that the classification of major incidents be based on visible characteristics that are associated with accidents that have long durations. These extended durations usually result from a need to mobilize and transport specialized vehicles to the incident scene, and the performance or other complex or arduous activities. Thus, major incidents would include:

- Accidents involving fires
- Accidents where there is a fatality or serious injury
- Accidents where a truck has spilled debris on the roadway
- Accidents involving trucks carrying hazardous materials
- Accidents where the vehicle has overturned

This concept of identifying major incidents by the characteristics of the accidents forms the basis of the definitions utilized in the database.

This database of almost 3000 major accidents has been constructed from the information contained in Florida's Accident Analysis and Reporting (AAR) files. These AAR files combine the data from the DHSMV Accident Reports with roadway characteristic data that is collected by the FDOT. This combined accident and roadway characteristic data set is maintained on FDOT's Burns Data Center mainframe computer in Tallahassee.

The State Safety Office has established a series of special purpose data AAR files that contain data for limited access facilities only. These files were screened and down-loaded to a microcomputer, where they were organized into a Major Accident Record System (MARS).

These MARS files were then sorted into 15 categories on the basis of accident characteristics that could be identified from the accident record. These categories are shown below.

MAJOR ACCIDENT CATEGORIES

| Accident Category | Description |
|-------------------|----------------------------------|
| 01 | Truck-Hazardous material & fire |
| 02 | Truck-Hazardous material |
| 03 | Truck-Fire |
| 04 | Truck-Fatality |
| 05 | Truck-Jackknifed tractor-trailer |
| 06 | Truck-Overturned |
| 07 | Truck-Injuries |
| 08 | Truck-Many vehicles involved |
| 09 | Truck-Vehicle disabling |
| 10 | Truck-Other |
| 11 | Auto-Fire |
| 12 | Auto-Fatality |
| 13 | Auto-Injury |
| 14 | Auto-Many vehicles involved |
| 15 | Auto-Simple (minor accident) |

The estimated average delay for the incidents in each category was derived from a sample of the accidents using a standard model of incident delay. This model uses four variables in the delay calculation: Freeway capacity, demand volume, flow past the incident, and incident duration.

Freeway capacity and demand volume were individually determined for each accident in the sample on the basis of the number of lanes on the facility, the Average Daily Traffic (ADT) on the facility, and the time-of-day of the accident.

The flow past the incident was derived from the number of lanes and the number of lanes that were blocked. An average number of lanes blocked was developed for each accident category from values taken during the review of more than 200 collision diagrams contained in the hardcopies of the accident report forms.

Average durations of the lane blockages for automobile accidents and truck accidents were determined from the review of records maintained by the Florida Highway Patrol Dispatchers.

The total delay and road user costs associated with these delays are shown in the accompanying table. The "costs" in this table are based on a travel time value of \$7.50/hour, a fuel cost of \$1.00/gallon, a fuel consumption rate of 4 gallons per vehicle hour of delay, and an emissions rate of 0.14247 pounds of pollutants per vehicle hour of delay.

These travel time and fuel costs are consistent with estimates in other reports recently produced for the FDOT. The fuel consumption and emissions values are taken from tables in the TRAF-NETSIM computer program reflecting operating characteristics of 25 mph average speed, with 25 percent of the time in an acceleration mode and 25 percent of the time in a deceleration mode.

The report concludes with a step-by-step procedure used in the formation of the initial database. This simplification is made possible by using the values of average delay per incident that were calculated as part of this project.

These recommendations for future improvements to the database include: adding the number of lanes blocked and the time that the blockage was removed to the Accident Report forms; changing FHP record-keeping procedures to add this information to the records kept by the dispatchers and FHP headquarters in Tallahassee; collecting sample values form the I-4 Surveillance and Control system in Orlando; and requiring more frequent interagency debriefings.

STATEWIDE IMPACT OF MAJOR INCIDENTS

| · | | | | | | Puci | |
|--------------|-----------|------------|-----------|-------------|------------|------------|-----------|
| | No. of | Delay | User Cost | Fisel Cost | Total Cost | Commed | Emissions |
| FM TEAM | Incidenta | (mill vbt) | (mill \$) | (mill \$) . | (mill \$) | (mill gal) | (tons) |
| ТАМРА ВАЧ | 578 | 1.9 | 14.4 | 7.7 | 22.0 | 7.7 | 137 |
| Hillsborough | 444 | 1.6 | 11.7 | 6.2 | 17.9 | 6.2 | 111 |
| Pinellas | 114 | 0.4 | 2.7 | 1.4 | 4.2 | 1.4 | 26 |
| JACKSONVILLE | 418 | 1.5 | 10.9 | 5.8 | 16.3 | 5.8 | 104 |
| ORLANDO FMT | 240 | . 0.8 | 5.9 | 3.1 | 9.0 | 3.1 | 56 |
| Orange | 192 | 0.6 | 4.8 | 2.6. | 7.4 | 2.6 | 46 |
| Semiáolo | 48 | 0.1 | 1.1 | 0.6 | 1.6 | 0.6 | 10 |
| BROWARD | 545 | 2.1 | 15.5 | 8.3 | 23.7 | . 8.3 | 147 |
| DADB | . 815 | 2.5 | 19.0 | 10:2 | 29.2 | 10.2 | . 181 |
| PALM BEACH | 390 | 1.2 | 1.8 | 4.7 | 13.6 | 4.7. | 34 |
| TOTAL | 2966 | 9.9 | 74.6 | 39.8 | 114.3 | 39.3 | 708 |

INTERAGENCY COMMUNICATIONS AT MAJOR INCIDNETS

Prepared For:
Florida Department of Transportation
State Traffic Operations

EXECUTIVE SUMMARY

The Florida Department of Transportation and other agencies within the State have become increasingly concerned with the problems caused by accidents and other incidents on its major roadways. Recent studies on urban freeway congestion by the Federal Administration have estimated that 65% of the delays on Freeways are caused by accidents and other incidents. These incident related delays result in wasted fuel consumption, extra vehicle emissions and can also cause secondary accidents.

Major incidents, such as those that involve overturned trucks, place additional burdens on the responding agencies. In addition to the financial consequences that public agencies incur when they respond to these accidents, the leaders of these agencies recognize that the roadway is a hostile environment, and that their personnel are at risk when these duties are being performed.

Freeway Incident Management (FIM) Teams have begun meeting in six of the urban centers around the state to identify ways of improving response to major (and minor) incidents. These FIM Teams are composed of representatives of the FDOT, FHP, and the Police, Fire and Emergency Medical Service Departments of the Counties and local communities that border the major highways.

One of the problems that has been identified in these meetings is communication between the different agencies responding to these incidents. The communications with other agencies within their profession. Communication with other professional groups, although previously recognized, has been given much less attention. The need to improve this inter-disciplinary communication has become more pressing because of the increasing frequency with which these groups are working together at major incidents.

The Florida Department of Transportation's efforts to promote improved Freeway Incident Management have included a contract with Frederic R. Harris, Inc., to provide Traffic Engineering Support Services for the Freeway Management Teams. One of the tasks of this Contract was a review of this interagency Field Communications problem. The two objectives of this task were to identify deficiencies in interagency communications among the agencies that respond to major freeway incidents, and to develop alternative recommendations for alleviating these deficiencies.

Although the recommendations of this work effort are applicable to all the agencies involved in Freeway Incident Management, several recommendations for improved interagency communications at freeway incidents have been included that are specific to the Florida Department of Transportation.

The Introduction for this report provides a more complete review of the interagency communications problem at major incidents, and highlights the number and variety of agencies that are responsible for various aspects of the response to a Major Incident.

Section 2, Emergency Communications Planning, reviews some of the more significant planning work that has been done during the last 25 years. This material presents an overview of the complex regulatory and technical environments that govern public safety radio communications.

A summary of the results of the surveys performed for this effort, and contacts with major vendors of communications equipment for the emergency service agencies are contained in Section 3. The data presented in this section were collected from various agencies and included incident notification procedures, existing land mobile communication systems, existing intra-agency and interagency communications problems and future upgrade plans. Discussions with vendors of communications equipment provide additional insight into the business aspects of Public Safety Radio Communications.

Section 4 presents two important findings: one, interagency communication and intra-agency communications should <u>NOT</u> be combined on a common communication channel; and two, although a common approach should be used for communication at freeway incidents, the details of the solution to the communication problem in these six FIM Teams may be different.

This section also identifies a series of alternative strategies for improving field communications and provides a qualitative review of their advantages and disadvantages.

The recommendations are presented in Section 5. One of these is to provide Police radios to supervisors of non-Police agencies, using funds from these non-Police agencies. Current FCC rules and regulations authorize this use as indicated in the following quote from Part 90.421 (b):

"Mobile units licensed in the Police Radio Service may be installed in any vehicle which, in an emergency, would require the cooperation and coordination with the activities of the Licensee."

This recommendations hinges on the licensed agency's willingness to give personnel from other agencies have been reluctant to provide this access. Although the access to the licensee's channels will be minimized by limiting the number of radios distributed to users in other agencies, this may not be acceptable to some licensees. If necessary, further restrictions can be included in the written agreement which will limit the users in other agencies to the channel designated for interagency communication at freeway incidents.

The members of the Freeway Incident Management Teams may be able to play an important part in this decision making process by lobbying for change from within. Through their conversations at the team meetings, the members of these teams have developed a better understanding of the responsibilities of the other agencies, and have become aware of the resources that these agencies can contribute to solving the problems caused by major incidents. If these personnel

can show their leaders that their agency will benefit from this recommendation, it will be accepted.

In addition to the selected distribution of Police Radios, the project staff recommends that these individuals also be provided with Cellular Telephones. However, strict controls should be placed on the phones to prevent their abuse.

The following Action List is a step-by-step program for implementation of these recommendations. Funding for several of these items may be available through Federal or State Demonstration Funds.

ACTION LIST

Mobile Radios

- Determine which agency should be designated as the Lead Communication Agency in each FIM Team. This will probably be the FHP or some other local Police agency. Factors to consider when selecting the lead agency should include:
 - Number of Mobile Radios authorized by the FCC.
 - Number of Mobile Radios currently operating.
 - Plans for shifting communications to other frequencies.
- Determine which of the Lead Agency's channels to use for interagency communications regarding freeway incidents.

 This may be a mutual-aid channel or another channel. This decision should also reflect the existing radios for these individuals should be submitted to the lead agency.
- Other agencies should identify the personnel within their agencies who should have access to this interagency communications channel. A request for radios for these individuals should be submitted to the lead agency.
- Individual agreements between the lead agency and each of the other agencies should be drawn up authorizing the use of these radios by personnel in these other agencies, and the restrictions and responsibilities associated with the use of this equipment.
- Each of the other agencies should follow the procedures of their organizations in obtaining funding for, and procuring, these units.
- The lead agency should provide appropriate training sessions after these mobile radios have been acquired by the other agencies and assigned to their personnel.

Periodic practice drills should be held to familiarize all
personnel with procedures to be followed when many agencies are
involved in responding to an incident.

Cellular Telephones

- Review the recommendations of this report with DIVCOM to seek agreement on the monitoring procedures that should apply to Cellular phones purchased for use at major freeway incidents.
- Each of the other agencies should follow the procedures of their organizations in obtaining funding for these units.
- Document the procedures that will be followed to monitor the use of this equipment.
- Prepare bid specifications for these units.
- Acquire the units.

TECHNICAL REPORT

SIGNAGE FOR ACCIDENT INVESTIGATION SITES

The Florida Department of Transportation has begun installing Accident Investigation Sites on various parts of the interstate Highway System as part of its efforts in the field on Freeway Incident Management

These Accident Investigation Sites (AIS) are designed to be used as emergency parking areas. They are large enough to accommodate several vehicles, and are located on the shoulder of an exit ramp or frontage road. The AIS are intended to be used for a variety of activities which require the short term parking of vehicles, these include: completion of accident report forms after an accident; temporary parking of a vehicle that has been damaged in an accident and removed from Police Officers; repair of flat tires and other minor problems that disable a vehicle, etc.

Construction of these Accident Investigation Sites is based on the goal of removing these short term parking activities from the shoulders of the mainline, and relocating them to a safer area that will reduce rubbernecking by motorists.

This Accident Investigation Site concept was originally developed by the Texas Transportation Institute and Texas Highway Department and was first implemented in 1971 (Ref. 1). In Florida, AIS have been installed on exit ramps in Dade, Broward, and Palm Beach Counties as part of the I-95 Expansion Program. A conceptual plan for these sites is shown in Existing 1. Selected photos of these sites on I-95 exit ramps have been reproduced in Exhibit 2.

Existing Signage

The signs proposed for the Accident Investigation Sites for sections of I-4, I-75 and I 275 in Hillsborough County, Florida are very similar to the signs that were used on the AIS in Texas (Ref.2). These signs are shown in Exhibit 3.

The signs installed for the Accident Investigation Sites on I-95 in Florida differ from the signs developed in Texas Prior to their installation, these signs were reviewed with the staff of the I-95 Public Information Office. The PIO staff believed that the words "Accident Investigation Site" did not adequately convey the intended purpose of these sites to motorists, and that these signs would not be understood. This observation was consistent with the work done in Texas, which indicated that "To increase efficiency, an educational program on the use and benefits of these sites should be conducted for the public.

As a result of the recommendation of the Public Information Office, the AIS on I-95 were called "Emergency Stopping Sites". Samples of the signage erected for these sites are shown in Exhibit 4. In hindsight, there is an unfortunate similarity between the intent indicated by these signs, and similarity between the intent indicated by these signs, and the standard "EMERGENCY STOPPING ONLY" sign that is used to Indicated that it is OK to use the shoulder of the mainline for Emergency Stopping.

Because of a desire to increase the use of the AIS, FDOT requested that Frederic R. Harris reexamine the AIS signage issue as part of its support services to Florida's Freeway Incident Management Teams.

RECOMMENDED SIGNAGE

Harris' review of the signage needed for the Accident Investigation Sites confirmed prior indications that signs are needed at two locations. Signage is required at the AIS to indicate the intended use of this area. Signs are also needed on the mainline to indicate the existence of an AIS are not located at every exit, or in a standard position at the exit.

A debate over whether to call these areas "Accident Investigation Sites" or Emergency Stopping Sites" on the signs is irrelevant. The objective of this signage is to get people to use this area for the intended purpose. The technical name for these areas is of no interest or relevance to the motorist. Thus, the signage should emphasize the emergency parking function of the area and need not mention the name.

Symbol for the Accident Investigation Site

After reviewing several of the signage options that have been proposed, the project staff has decided to recommend the use of a white capital letter P on a blue background as the symbolic sign for the Accident Investigation Site.

There are several factors that led to this recommendation. The capital letter P is already associated with parking. It appears on the standard parking guides sign (D4-1), as well as on several signs that restrict parking (R7-2a, R7-107a, and R8-103a). A white on brown version of this sign (RA-080) is used as a designator for parking areas in recreational and cultural interest areas.

The use of blue for these signs is consistent with the Accident Investigation site signs used in Texas, and with the intent of the use of the blue color, i.e., it is an informational sign relating to motorist services. The blue color is also used for several other signs relating to possible emergencies, including the H used as the Hospital symbol (D9-2), the EMS symbol (D9-13), the POLICE sign (D9-14), the telephone symbol (D9-1), and the Hurricane Evacuation Route symbol (FTP-911).

Use of the standard green on white Parking sign (D4-1), which contains a 15" capital letter P plus the 3" high capital letters ARKING, was also considered. However, this sign is intended as a designator for a parking area to be used under less restrictive conditions. A green background is also more closely associated with guidance than with service.

Signage at the AIS

The project staff recommends that the sign at the Accident Investigation Site be a two-part sign. The top part would consist of the white on blue capital letter P. The bottom of the sign would consider of the standard black on white regulatory "EMERGENCY PARKING ONLY" sign (R8-4).

The combined display of this symbolic sign and this regulatory sign defines the meaning of the symbolic sign. The R8-4 sign concisely communicates the function of the AIS. It identifies the type of parking that should occur, discourages other types of parking, and provides law enforcement with a rule that can be easily enforced.

The sizes for the R8-4 sign indicated in the $\underline{\text{MUTCD}}$ (Ref. 3) are 48 x 36 inches on Freeways and 30 x 24 inches on mainline of the freeways, but on ramps and other locations with slower speeds, it is suggested that the smaller size be used.

The FHWA's Standard Highway Signs (Ref. 4) generally specifies either a standard 24" width or a special 30" width for the D9-n General Service Signs. Both of these sign sixes were field tested in combination with the R8-4 sign. On the basis of the overall appearance of this sign combination, it

is recommended that the 30" symbolic AIS sign be used. A photograph of this configuration is shown in Exhibit 5.

Trailblazers

The white on blue symbolic sign is also recommended for use as the trailblazer on the mainline. Two supplementary plaques were considered for use with this sign. The first of these was a small educational plaque containing the word EMERGENCY in white letters on a blue background. A second small white on blue plaque that was considered would contain a distance indication to the state, or a directional arrow.

The size of this trailblazer would follow the dimensions indicated in Standard Highway Signs for the other symbol signs. These range in size from 18" square to 30" square. The 18" square size and 24" square size were tested in the field with supplementary "EMERGENCY" and distance plaques of a width equal to the symbol sign.

A photograph of the sign that was field tested is shown in Exhibit 6. These field tests indicated that the capital letter P could be easily distinguished at distances of 500 on either the 18" or 24" sign. The distance indication on the 24" wide sign was legible at 200', but was only marginally legible on the 18" wide sign. The field tests also indicated that the 9 letters of the word "emergency" are too closely spaced to be clearly distinguished at a distance greater than 40 to 70 feet on either the 18" wide or 24" wide sign.

As a result of this field test the staff recommends the use of the 24" square sign, along with a 24" wide supplemental plaque containing the distance to the site or a directional arrow. The supplementary plaque with the work "emergency" should be changed to a black on white format for greater legibility, or deleted.

NATIONAL UNIFORMITY

Although drivers may not immediately understand the meaning of the symbolic AIS sign, the staff believes that repeated exposure to the combined symbol sign and regulatory sign at the AIS on the exit ramps will quickly teach drivers the meaning of this symbol.

Calls to FHWA personnel in Washington have indicated that there are no current proposals regarding signage for Accident Investigation Sites before the National Committee on Uniform Traffic Control Devices. However, these calls have revealed that several states besides Florida and Texas are in the

process of adding Accident Investigation Sites to their roadways. The project staff believes that there should be a national standard for AIS signage, so that motorists from different parts of the country are aware of the availability of an Accident Investigation Site when they are in need of this facility.

References

- 1. A Study of Accident Investigation Sites on the Gulf Freeway; Texas Transportation Institute and Texas Highway Department; Report Number 165-1; August 1972
- 2. TAMPA INTERSTATE STUDY: Task F6f Freeway Traffic Management
 Plan; Greiner, Gannett Fleming, TTI, and Knight Appraisal
 Services; March 1989
- 3. Manual on Uniform Traffic Control Devices: 1988 Edition; FHWA/USDOT; US Government Printing Office; Washington, D.C.
- 4. <u>Standard Highway Signs:</u> 1979 Edition and Revisions.; Federal Highway Administration, USDOT; Washington, D.C.

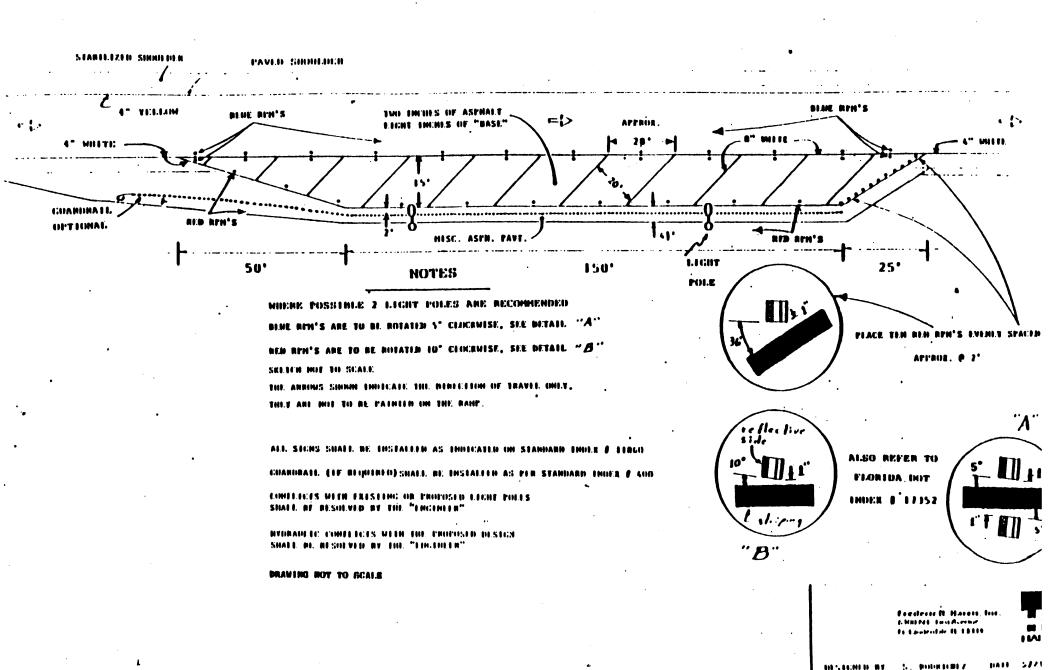


Exhibit 1

Kerned 10/8





Exhibit 2
Photographs of Accident Investigation Sites on I-95 Exit Ramps

EMERGENCY - STOPPING | SITE. -

EMERGENCY STOPPING SITE THIS EXIT

Exhibit 4
Signing for I-95
Accident Investigation Sites



Exhibit 6
Trailblazers for the
Accident Investigation Sites

MEMORANDUM

To: Attendees of TRB Conference on Traffic Management and Planning for

Freeway Emergencies and Special Events

From: Steve Shapiro / JHK & Associates

Date: January 2, 1992

Re: Freeway Incident Management Team Meetings

FM Team meetings usually work best when there is a particular item on the agenda that the attendees are interested in. Here is a list of-topics and ideas that we have used in the past at FIM Team meetings in Florida.

- 0 Hazardous Materials Accidents
- o Preparation of Alternate Route Maps (with Consultant Support)
- Panel discussions w/ reps from large trucking companies, heavy duty wrecker operators, insurance company representatives. (The ATA is a good contact for the trucking companies.) (One of the heavy duty wrecker is a regular participant at the team meetings.)
- Presentations by vendors of special equipment
- Presentation of special equipment by Emergency Service Agencies
 Mobile vehicles with multi-agency Communications capabilities
 Helicopters for evacuating seriously injured people
 Computerized signal system facilities
- Hurricane Evacuation Plan Reviews
- Reviews of construction projects that involve street or lane closures
- Checklist for identifying major incidents (and activating contingency plans)
- Telephone contact list and contingency plan actions
- Debriefings after major incidents
- Production of Public Service Announcements

Its also a good idea 'to rotate the location of the meetings and use the facilities of several members of the Team.